REMARKS

This is in response to the Official Action dated July 16, 2008. Claims 6, 7, 13 – 16, 23, 24 and 33 are currently under examination. Claims 1 – 5, 8 – 12, 17 – 22, 25 – 32 and 33 – 38 stand withdrawn. No amendments to claims 6, 7, 13 – 16, 23, 24 or 33 are believed necessary to distinguish these claims patentably from the cited art. A typographical error in claim 23 is corrected.

Claims 6, 7, 13 – 16 and 33 stand rejected as anticipated by U.S. patent No. 6,418,039 of Lentini et al. under 35 U.S.C. § 102(e). Claims 13 – 15, 23 and 24 stand rejected as unpatentable over the Lentini et al. patent in view of U.S. patent No. 6,400,579 of Cuk under 35 U.S.C. § 103(a). Both of these rejections are respectfully traversed.

The application relates to control of a DC-DC flyback converter. An important feature of the control is to eliminate or nearly eliminate (1) power losses due to cross-conduction between a main, controllable switch in a primary circuit of the converter and a secondary circuit's synchronous rectifier and (2) reverse recovery losses, both of which losses DC-DC flyback converters are subject to. See specification page 6, lines 9 – 12. This is accomplished by a control circuit that processes in a sequence information relating to control of the primary's main switch, voltage across a secondary winding of a power transformer and voltage across the synchronous rectifier. From this a final control signal is obtained for the synchronous rectifier that accomplishes the above loss reductions or eliminations. Specification page 3, lines 8 – 13. In the embodiment at issue the synchronous rectifier is turned ON in dependence on the establishment of a voltage across the secondary winding of the converter's main transformer and the synchronous rectifier is turned OFF in dependence on the turning ON of the main switch in

the primary circuit. Specification page 4, lines 8 – 15. Claims 6, 7, 13 – 16 and 33 relate to controlling the converter in the above manner.

The relied-upon Lentini et al. patent describes digital control of synchronous rectifiers in "switched mode power supplies," such as DC-DC converters, where a transformer isolates the primary circuit from the secondary circuit. A digital controller 30 for synchronous rectifiers in the secondary circuit is diagrammed schematically in Fig. 12. A control entity which is said to be a "finite states machine" 34 is described as cooperating with a set of up/down counters 36, 37, 38, 39. The digital controller 30 determines when the synchronous rectifiers in the secondary circuit are switched into and out of conduction.

Claim 6, and by their dependency claims 7 - 22, require "turning ON a synchronous rectifier in dependence on establishment of a voltage across a secondary winding of a main transformer," and "turning OFF the synchronous rectifier in dependence on turning ON of a main switch in the primary circuit." Nothing in the Lentini et al. patent suggests that the controller of the Lentini et al. patent is activated so as to meet these requirements.

A "finite states machine" is understood to be not actually a physical component, but rather an analytical construct used, for example, to graphically depict operations or desired operations of a circuit, computer or computer program. For this reason Fig. 12 of the Lentini et al. patent does not make clear the actual circuitry used to accomplish the control described in the patent. In this respect the Lentini et al. patent not only fails to meet the terms of claim 6, but the patent is not a sufficient teaching or enabling reference to teach one of ordinary skill in the art to make and use the digital controller that it refers to.

Also each diagram of a power supply (Figs. 6, 8, 10, 20, 21 and 21) shows a symbol that implies a relationship between the primary circuit, transformer and secondary circuit that is not

believed to be an accepted symbol for a circuit element. The apparently non-standard symbol is the arrow connected to the output Vo and pointing to a circle that may be a sensing winding connected with the controller 13 for the primary switch 12. See the encircled portion of Fig. 21 marked "X" below. In this regard too the Lentini et al. patent appears to be so unclear as not to qualify as an enabling prior art reference. If the examiner chooses to continue rejecting claims in this application over the Lentini et al. patent, taken alone or with other art in combination, the examiner is requested to provide documentary support for (a) how the "finite states machine" of the Lentini et al. controller can be accomplished, and (b) the identity and function of the circuit diagram feature indicated at "X" below.

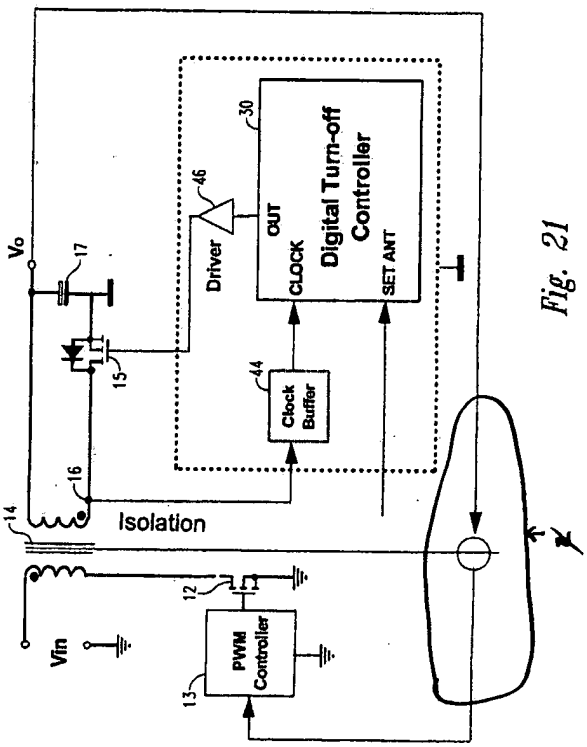

Fig. 21

Because the Lentini et al. patent relied upon in the rejection of claim 6 fails to teach the limitations of claim 6 as to the turning "ON" and "OFF" of the synchronous rectifier and because the patent does not appear sufficient to serve as "prior art," withdrawal of the outstanding rejection of independent method claim 6 and the claims dependent from claim 6 is respectfully requested. Claim 6, rejected dependent claims 7 and 13 – 16, and the withdrawn dependent claims 8 – 12 and 17 – 22 contain patentable subject matter and should now be allowed.

Also rejected as anticipated by the Lentini et al. patent, independent apparatus claim 33, drawn to the DC-DC flyback converter has a control circuit with:

> (a) means for turning ON the synchronous rectifier in dependence on a voltage developed across a secondary winding on the main transformer, and
> (b) means for turning OFF the synchronous rectifier in dependence on the first control signal turning ON the controllable switch.

Because neither of the means of claim 33 is taught or suggested by Lentini et al., claim 33 should now be allowed. Additionally for the reasons discussed above the Lentini et al. patent does not appear to be an enabling disclosure qualifying as prior art capable of teaching the invention to one skilled in the art and the rejection of claim 33 over Lentini et al. should be withdrawn.

Claims 34 and 35, presently withdrawn from examination, are dependent from claim 33 and by that dependency contain the allowable subject matter of claim 33. These claims should now be allowed.

Claims 13 – 15, rejected as obvious over Lentini et al. and Cuk, include by their dependency the steps of independent method claim 6. The Cuk patent does not teach the timing of turning "ON" and "OFF" the synchronous rectifier lacking in Lentini et al. and so a combination of the teachings of the two patents will not result in the claimed invention of dependent claims 13 – 16. These claims should now be allowed.

In rejecting claims 13 - 15, the examiner relies on the Cuk patent to show "flux cancellation." Apparently the examiner is referring to "winding the control secondary winding on the two outer flux paths in current cancelling relation as to flux conducted to the two outer paths from the center flux path," as set forth in claim 13. Cuk does not show this, however. The rejection of claims 13 – 15 is thus in error and should be withdrawn for this reason as well.

The flux cancellation feature is a further important aspect of the control signal generating arrangement of the invention. Claim 23 is an independent claim and claim 24 is dependent from claim 23. Claim 23 calls for:

> the main transformer having a magnetic core with a center flux path on which is wound a main primary winding, and the magnetic core having two outer flux paths on both of which is wound the control secondary winding, the control primary winding being wound on at least one of the outer flux paths, the control secondary winding being wound on the two outer flux paths in current canceling relation with respect to flux conducted to the two outer flux paths from the center flux path, whereby a control signal generated in the control secondary winding is substantially unaffected by flux developed in the main transformer by currents in the main primary winding.

This arrangement is not shown in either Lentini et al. or Cuk. A transformer having a core with a central flux path and two outer flux paths is shown in each of Figs. 33, 34, 39b and 39c of Cuk. That the transformers of Figs. 33 and 39b are not wound as called for in claim 23 is immediately apparent. The windings of the transformers of Figs. 34 and 39c are not in flux cancelling relation, rather the outer windings are secondary windings of the transformers wound so that the voltages induced on them add. See column 33, lines 2 – 4, and column 37, lines 11 – 14 of Cuk. Consequently the rejection of claims 23 and 24 as obvious over Lentini et al. and Cuk is in error. Claims 23 and 24 should now be allowed.

Withdrawn claims 25 – 32 include by their dependencies the allowable content of claim 23 and should now be allowed.

A three month extension of time to respond to the Official Action is requested and the appropriate fee is submitted with this amendment. Authorization is given to charge any additional fees associated with this communication to Deposit Account No. 070135.

Any questions or suggestions regarding the application or the amended claims submitted herewith should be directed to the undersigned attorneys for applicants at the telephone number listed below or by email to the email address listed below.

Respectfully submitted,

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